UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 5411

CSAH NO. 30

OVER THE

MINNESOTA RIVER

DISTRICT 4 - BIG STONE COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 90)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 5411, the East and West Abutments and Piers 1 and 2, were found to be generally in good condition below water with no observed defects of structural significance. The channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) The below water concrete was smooth and sound with no defects of structural significance observed.

(B) Several areas of section loss were observed above the waterline on the corners of the East and West Abutments. The areas of section loss at the north corner of the West Abutment and the south corner of the East abutment also exhibited exposed reinforcing.

RECOMMENDATIONS:

(A) Monitor the areas of section loss with exposed reinforcing steel during future inspections, and if found to be progressing, repairs may be warranted at a later date.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 5411

Feature Crossed: The Minnesota River

Feature Carried: CSAH No. 30

Location: District 4 - Big Stone County

Bridge Description: Bridge No. 5411 is a three span, multiple concrete beam structure supported by two concrete abutments on piles, and two concrete piers on piles numbered 1 and 2 starting from the west.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: October 30, 2002

Weather Conditions: Cloudy, "25EF

Underwater Visibility: "1 Foot

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments and Piers 1 and 2.

General Shape: The piers are oblong, rectangular shafts with rounded noses. The abutments are rectangular and box-like with perpendicular wingwalls. All of the substructure units are supported by rectangular footings founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 7.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the north side of Pier 2.

Water Surface: The waterline was approximately 3.6 feet below reference.
Assumed Waterline Elevation = 96.4 feet

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

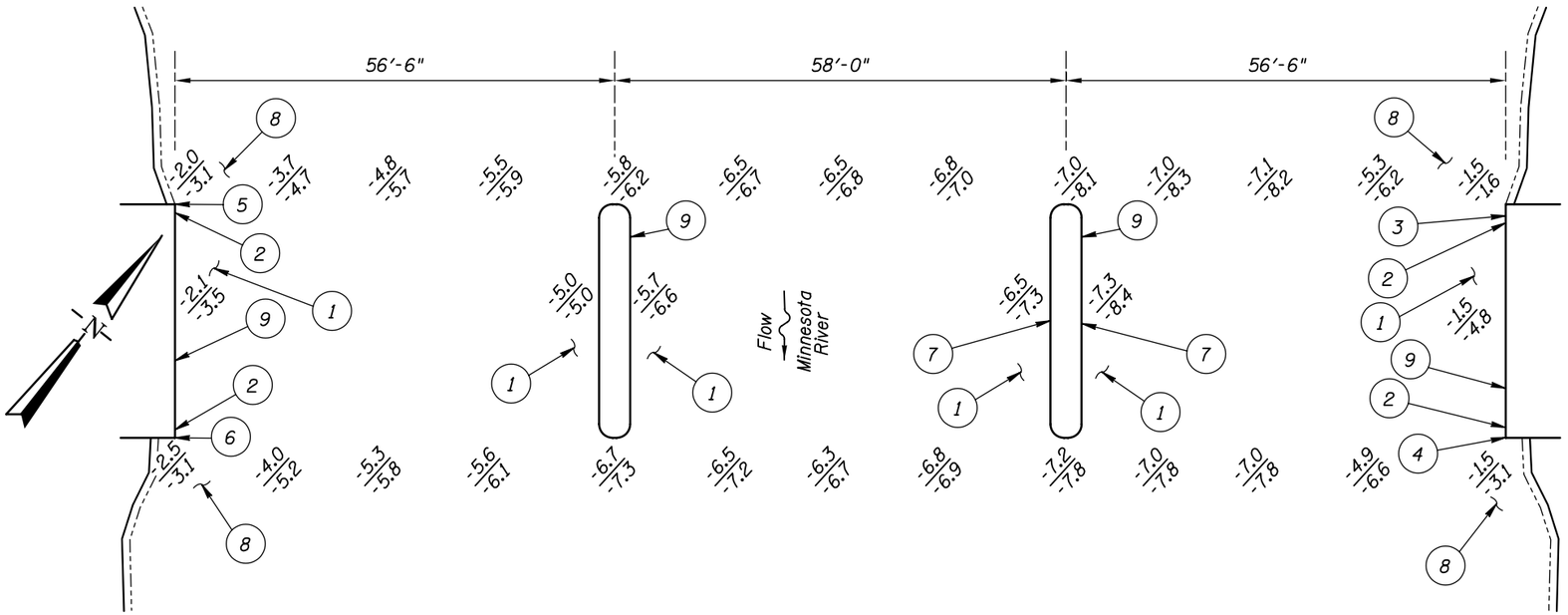
Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/10/02

Item 113: Scour Critical Bridges: Code I/93

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes __X__ No



SOUNDING PLAN

GENERAL NOTES:

1. The East and West Abutments and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on October 30, 2002 the waterline was located approximately 3.6 feet below the pier cap at the upstream end of Pier 2. Since insufficient bridge elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed elevation the waterline elevation was 96.4.
3. Soundings indicate the water depth at the time of inspection and are measured in feet
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of silt and sand with up to 6 inches of probe rod penetration.

(2) Minor hairline cracks with efflorescence on the corners of the abutments extending from the top of the abutment to the waterline.

(3) Area of section loss, 6 inches high with 4 inches of penetration located 4 feet above the waterline.

(4) Area of section loss, with exposed reinforcing steel, 3 feet wide with 6 inches of penetration extending from the waterline to 2.5 feet above the waterline.

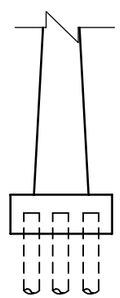
(5) Area of section loss, 6 inches high with 3 inches of penetration located 3 feet above the waterline.

(6) Mapcracking and impending section loss with exposed reinforcing steel, at top of cap measuring 12 inches wide by 3 inches high at 2 feet above the waterline.

(7) Vertical hairline crack extending from the top of the cap to the waterline.

(8) The channel bottom material around the corners of the abutments consisted of 1 to 2 foot diameter riprap.

(9) Below water, the concrete was in good and sound condition.



TYPICAL END VIEW OF PIERS

Legend

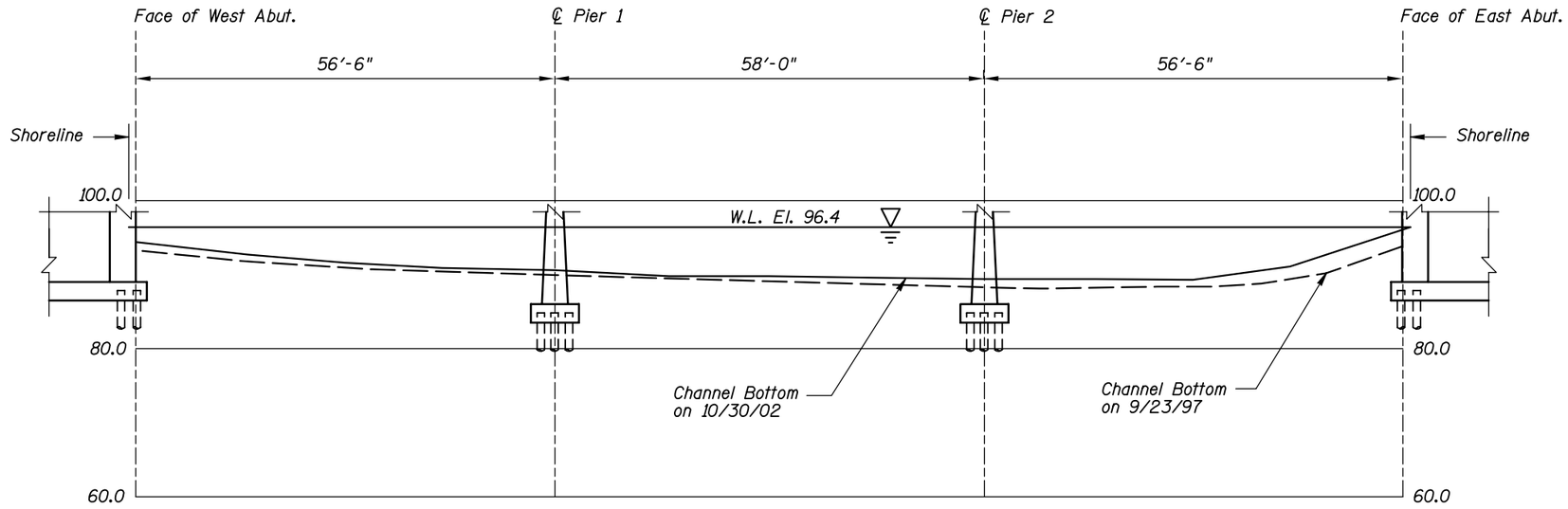
-2.0	Sounding Depth from Waterline (10/30/02)
-5.2	Sounding Depth from Waterline (9/23/97)

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

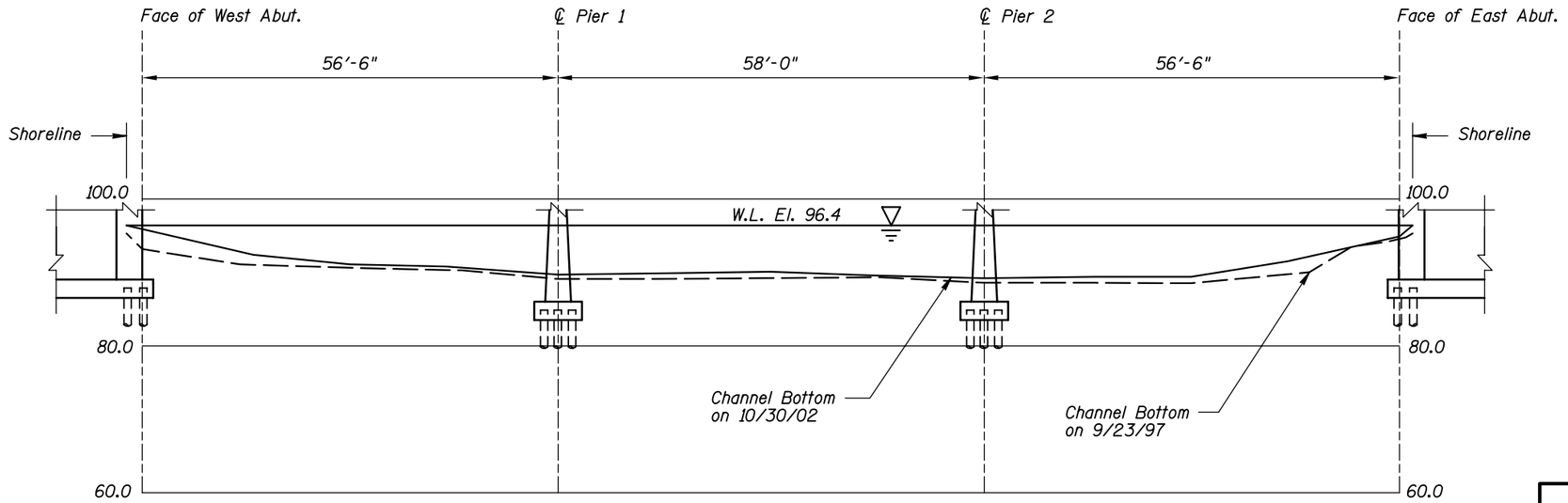
STRUCTURE NO. 5411
OVER THE MINNESOTA RIVER
DISTRICT 4, BIG STONE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120090		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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OVER THE MINNESOTA RIVER
DISTRICT 4, BIG STONE COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=20'
Code: 35120090		Figure No.: 2

Photograph 1. Overall View of Structure, Looking East.

Photograph 2. View of West Abutment, Looking South.

Photograph 3. View of Pier 1, Looking East.

Photograph 4. View of Pier 2, Looking South.

Photograph 5. View of East Abutment, Looking East.

Photograph 6. View of the South Corner of the East Abutment with Area of Section Loss and Exposed Reinforcing, Looking East.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 30, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 5411 WEATHER: Cloudy, "25EF
WATERWAY CROSSED: The Minnesota River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, u/w Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 1:20 P.M.
TIME OUT OF WATER: 1:50 P.M.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY "1 foot
DEPTH 7.3 feet maximum at Pier 2
ELEMENTS INSPECTED: East and West Abutments and Piers 1 and 2
REMARKS: Overall, the below water concrete of the substructure units was smooth and sound with no structurally significant defects observed. Above the waterline, the concrete exhibited several areas of section loss and hairline cracking. The corners of both abutments exhibited areas of section loss with exposed reinforcing. The channel bottom appeared stable with no appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Monitor the areas of section loss with exposed reinforcing steel during future inspections, and if found to be progressing, repairs may be warranted at a later date.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5411
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Minnesota River

INSPECTION DATE October 30, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	West Abutment	1.5’	N	7	N	9	N	7	8	N	8	N	8	7	N	N	7	N	N
	Pier 1	7.3’	N	8	N	9	N	7	8	N	N	N	8	8	N	N	N	N	N
	Pier 2	6.7’	N	7	N	9	N	7	8	N	N	N	8	7	N	N	7	N	N
	East Abutment	2.5’	N	7	N	9	N	7	8	N	8	N	8	7	N	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the below water concrete of the substructure units was smooth and sound with no structurally significant defects observed. Above the waterline, the concrete exhibited several areas of section loss and hairline cracking. The corners of both abutments exhibited areas of section loss with exposed reinforcing. The channel bottom appeared stable with no appreciable changes since the previous inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.